

CLAIMS

What is claimed is:

1. An apparatus for creating an opening in a tissue vessel and introducing an object into the vessel through the opening, the apparatus comprising:
 - a hollow member;
 - a piercing element movable relative to said hollow member to remove a tissue plug from the vessel and thereby create an opening therein; and
 - an introducer located substantially around at least part of said hollow member, wherein said piercing element and said hollow member are movable relative to said introducer to allow introduction of the object into the opening in the vessel through said introducer.
2. The apparatus of claim 1, wherein said hollow member and said introducer are at least initially substantially coaxial.
3. The apparatus of claim 1, further comprising a shaft extending proximally from said piercing element, wherein a space adjacent to said shaft is configured to receive the tissue plug.
4. The apparatus of claim 3, wherein said space is substantially annular about said shaft.
5. The apparatus of claim 1, further comprising a cutting edge formed on said hollow member.

6. The apparatus of claim 5, wherein said cutting edge is located at the distal end of said hollow member.

7. The apparatus of claim 1, wherein said piercing element is retractable at least partially into said hollow member.

8. The apparatus of claim 1, wherein said hollow member is substantially tubular.

9. The apparatus of claim 1, wherein said hollow member is a tissue trap.

10. The apparatus of claim 9, further comprising at least one locking element configured to releasably lock said tissue trap relative to said introducer.

11. A system for performing anastomosis to a tissue vessel; the apparatus comprising:

a cutter;

an element movable relative to said cutter to remove a tissue plug from the vessel and thereby create an opening therein;

an anastomosis device; and

an introducer having an axis substantially along which said anastomosis device is introduceable into the opening, wherein said element and said cutter are movable away from said axis to allow motion of said anastomosis device substantially along said axis.

12. The system of claim 11, wherein said cutter has a substantially circular cutting edge.

13. The system of claim 11, wherein said cutter and said penetrating element are initially substantially coaxial.
14. The system of claim 11, wherein at least one of said cutter and said element is movable laterally with respect to said introducer axis.
15. The system of claim 11, wherein said introducer is substantially tubular along at least a portion of its length.
16. A tissue cutting system for creating an opening in a tissue vessel, comprising:
 - a cutter;
 - a piercing element movable relative to said cutter to remove a tissue plug from the vessel, said piercing element defining a tissue receiving space proximal to its distal end; and
 - a member configured to receive said piercing element, said member having an aperture defined in a side thereof through which said piercing element is at least partially removable.
17. The system of claim 16, wherein said member is substantially tubular.
18. The system of claim 16, wherein said piercing element includes a proximally-extending shaft, and wherein said tissue receiving space is adjacent to said shaft.
19. The system of claim 18, wherein said tissue receiving space is substantially annular.

20. The system of claim 16, wherein said cutter is formed on said member.
21. The system of claim 20, wherein said cutter is located at the distal end of said member.
22. The system of claim 16, wherein said member is a tissue trap.
23. The system of claim 22, further comprising an introducer relative to which said tissue trap is movable.
24. The system of claim 23, wherein said introducer is substantially tubular.
25. The system of claim 23, wherein said introducer and said tissue trap are initially substantially coaxial with one another.
26. The system of claim 23, wherein at least a portion of said tissue trap is located initially within said introducer.
27. The system of claim 23, further comprising at least one locking element configured to releasably lock said tissue trap relative to said introducer.
28. The system of claim 27, wherein at least one said locking element is a cam element.
29. The system of claim 27, wherein at least one said locking element is a tab.
30. The system of claim 27, wherein at least one said locking element is a pin.

31. The system of claim 27, wherein at least one said locking element is a collar.
32. The system of claim 16, wherein at least one of said piercing element and said cutter is removable through said aperture.